0143-0473-6PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
Daniel CELERIER, et al.	: EXAMINER: JIMENEZ, M.
SERIAL NO: 09/402,472	:
RCE FILED: December 2, 2002	: GROUP ART UNIT: 3726
FOR: INTERNAL COMBUSTION ENGINE EXHAUST DEVICE AND METHOD FOR MAKING SAME	:

APPEAL BRIEF UNDER 37 C.F.R. § 1.192

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

In response to the Notification of Non-Compliance with 37 CFR 1.192(c), the Appellants are submitting a new brief that is in compliance with 37 CFR 1.192(c). The Appellants hereby appeal the final rejection of Claims 8-11, 13-16, 18, and 19, as set forth in the final Office Action dated January 16, 2003, and the Advisory Action dated May 1, 2003.

I. REAL PARTY IN INTEREST

The real party in interest is Renault of Boulogne Billancourt, France.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-7, 12, and 17 have been canceled. Claims 8-11, 13-16, 18, and 19 are active, finally rejected, and appealed.

IV. STATUS OF AMENDMENTS

All amendments have been entered.

V. SUMMARY OF THE INVENTION

The present invention relates to an exhaust device for internal combustion engines and a process for making the exhaust device. (Page 1, lines 3-5.) More particularly, the present invention is directed to an exhaust device including an exhaust pipe provided with a housing suitable for mounting a measuring sensor, and the process for making such an exhaust device. (Page 1, lines 5-8.)

The claimed invention includes an exhaust device where an internally threaded hole is provided in an exhaust pipe, where the hole is made directly through the wall of the pipe. (Page 2, lines 24-29.) The exhaust device includes a measuring transducer configured to analyze a flow of exhaust gases from the engine, and a pipe element adapted to carry the flow of exhaust gases from the engine. (Page 3, lines 1-5.) The pipe element includes an integral housing in which the measuring transducer is mounted. The housing includes a threaded hole that extends through a bush extending only through a wall of the pipe element. (Page 3, lines 6-9.) The bush has an interior portion and an exterior portion, where the interior portion extends further within an interior of the pipe element than the exterior portion extends beyond an exterior of the

pipe element. (Figures 1 and 3.)

The claimed invention also includes a process of making an exhaust device where an integral housing is formed in a pipe element from a flow-drilling operation comprising drilling through only a wall of the pipe element with a tool at a speed and a penetration force adapted to cause melting and upsetting of a material of the wall around the tool in proportion to an advance of this tool until a bush of required height and diameter is obtained. (Page 5, line 14, through page 6, line 4.) A hole is tapped through the bush to form internal threads in the hole, and a measuring transducer is mounted within the housing such that the measuring transducer is configured to analyze a flow of exhaust gases from the engine. (Page 6, lines 5-23.)

For example, in the exemplary embodiment of Figure 1, the exhaust pipe element 1 is provided on an exhaust line of an internal combustion engine. (Page 5, lines 1-4.) The pipe 1 is equipped with a housing 2 for a measuring sensor, such as a lambda oxygen sensor. (Page 5, lines 4-10.) The process of forming the housing 2 is described with reference to Figures 2 and 3. (Page 5, lines 11-13.) In Figure 2, a flow drilling operation is performed using an ogival mandrel or punch 4, which is rotated at high speed (e.g., in excess of 500 rpm, and preferably between 3000 and 5000 rpm) and driven into the pipe with a certain penetration force. (Page 5, lines 16-21.) The contact between the rapidly rotating tip of the mandrel 4 and the pipe 1 produces a large local temperature rise, which transfers the metal of the pipe to the plastic state. (Page 5, lines 22-24.) The thrust exerted by the driven mandrel 4 causes it to penetrate progressively through the wall of the pipe 1 to form a hole. (Page 5, lines 24-27.) The metal flowing in the feed direction of the mandrel 4 forms a neck formed on an interior side of the pipe 1, and the metal flowing in a reverse direction forms a flange on an exterior side of the pipe.

(Page 5, line 27, through page 6, line 1.) A collar 41 situated on an upper part of the mandrel 4 turns down the metal flowing in the reverse direction, thus giving the flange a planar surface, which facilitates support and leaktightness of the sensor 3. (Page 6, lines 1-4.)

The result of the flow drilling operation is an accurately sized hole 21 prolonged by a bush 22. (Page 6, lines 5-6.) The interior neck portion of the bush 22 extends further within the interior of the pipe 1 than the exterior flange portion of the bush 22 extends beyond the exterior of the pipe 1. (Figures 1 and 3.)

A chipless thread tapping operation is then performed on the hole 21 to form threads 23 by deformation of the material of the bush 22. (Page 6, lines 11-13.)

VI. ISSUES

ISSUE 1: Whether Claim 8 is not patentable as obvious under 35 U.S.C. § 103(a) over U.S. Patent No. 4,526,672 (Reed) in view of U.S. Patent No. 3,429,171 (Feher).

ISSUE 2: Whether Claims 9-11 are not patentable under 35 U.S.C. § 103(a) over Reed in view of Feher and further in view of page 2, line 4, of the present application.

ISSUE 3: Whether Claims 13, 14, 16, 18, and 19 are not patentable as obvious under 35 U.S.C. § 103(a) over Reed in view of Feher and further in view of U.S. Patent No. 5,984,138 (Olson).

ISSUE 4: Whether Claim 15 is not patentable under 35 U.S.C. § 103(a) over Reed in view of Feher and Olson, and further in view of page 2, line 4, of the present application.

VII. GROUPING OF CLAIMS

For purposes of this appeal, Claims 8-11, 13-16, 18, and 19 are individually patentable as argued below and do not stand or fall together.

VIII. ARGUMENT

A. ISSUE 1

Regarding the first issue on appeal, the final Office Action combines the teachings of Reed with the teachings of Feher in order to arrive at the invention recited in Claim 8. However, the Examiner has committed reversible error in concluding the claimed invention to be obvious over the cited prior art, as there is simply no motivation to make this combination.

Reed does not teach several of the limitations of the invention recited in Claim 8. In an attempt to remedy the deficiencies of Reed, the Official Action cites Feher and concludes that "[i]t would be obvious to one of ordinary skill in the art, at the time of the invention to have provided the invention of Reed with a bush with an interior portion that extends further than the exterior portion, in light of the teachings of Feher, in order to provide a stronger structural support for the measuring transducer." (See second paragraph on page 4 of the Official Action dated January 16, 2003.) However in order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (See M.P.E.P. §2143.) Appellants submit that no

motivation existed at the time of the invention to combine the reference teachings of Reed and Feher.

1. There is no motivation to combine the teachings of Reed and Feher.

Independent Claim 8 recites an exhaust device that includes, among other features, a bush having an interior portion and an exterior portion, where the interior portion extends further within an interior of the pipe element than the exterior portion extends beyond an exterior of the pipe element. As noted in the Official Action dated January 16, 2003, the Examiner has recognized with respect to Claim 8 that Reed does not disclose a bush having an interior portion that extends further than an exterior portion (page 3, last paragraph, and page 5, second paragraph). However, the Examiner alleges that Feher teaches a bush 78 having an interior portion 82 extending further than the exterior portion 102. (Page 4, first paragraph, and page 5, third paragraph.) The Examiner alleges that it would have been obvious to one of ordinary skill in the art, at the time of the invention, to have provided the invention of Reed with a bush with an interior portion that extends further than the exterior portion, in light of the teachings of Feher, in order to provide a stronger structural support for the measuring transducer. (Page 4, second paragraph, and page 5, fifth paragraph of the Official Action dated January 16, 2003.)

The Appellants submit that invention described in Feher should not be combined with the invention described in Reed. The Appellants submit that Reed relates to a field of art that is separate and distinct from the invention of Feher that one of skill in the art would not have looked to at the time of the conception of the present invention. The Appellants recognized that a need existed in the exhaust sensor mounting art, and provided a solution that had not

previously been conceived of in the exhaust sensor mounting art in order to provide a structure and method that produce advantageous results over other structures in the exhaust sensor mounting art.

Reed is directed to an exhaust gas sensor, which is generally in the same field of art as the present invention. However, Feher is directed to the fastening of soft sheets of metal. (See Figures 7 and 8 of Feher.) Feher describes forming holes in flat portions of soft sheet metal. The holes are formed by using a backing member (16) having suitable apertures and a drill (10) positioned above a section (14) of sheet metal. One of ordinary skill in the art would not look to an invention related to the fastening of soft sheets metal to solve the problems present in the exhaust sensor mounting art. In fact, the use of a backing member (16) as taught in Feher to form holes in a pipe would likely prove to be difficult in that the extended portion (40) would extend within the aperture of the backing member (16)(presumably positioned within the interior of the pipe), which would prevent the backing member (16) from being removed from the pipe following the formation of the hole.

As evidence of the assertion that those skilled in the art had not utilized such techniques in the exhaust sensor mounting art to produce an integral housing in an exhaust pipe element as claimed, the Examiner was presented with a Declaration by Alain Pierdet under 37 CFR 1.132 filed on December 2, 2002, which indicated that flow-drilling operations have not been utilized to mount a sensor in an exhaust pipe of an engine. In fact, Mr. Pierdet indicated that methods that are distinctly different from those described in Feher are typically used in the exhaust sensor mounting art. Such conventional methods were discussed using two references of record, namely U.S. Patent Nos. 4,437,971 and 5,571,397, as representative examples.

Mr. Pierdet provided a declaration indicating that the present invention solved a problem that had not been previously solved in the exhaust sensor mounting art. In the declaration, Mr. Pierdet indicated that the aim was to replace the method used until now by Renault involving a built up ring fixed by welding on the exhaust pipe, with a new method providing the same functions at lower cost. The specification of the present application discusses the disadvantages of such welded rings such as a large percentage of defects in assembly and leaktightness. (See page 2, lines 10-23.) The specification indicates that the heat generated during welding tends to deform the internal threads of the rings, which can have the effect of either preventing the sensor from being screwed in or unscrewed from the threads of the rings. In addition, these deformations affect the leaktightness of the assembly and therefore cause burned gases to leak out or, depending on the operating point of the engine, even air to be sucked in, which is particularly detrimental to the quality of the measurements, especially when the sensor is an oxygen sensor.

In the declaration, Mr. Pierdet indicated that the present invention provides numerous advantages over methods that utilize two different technologies and two different operations, namely boring and welding, to form the boss. The present invention provides a functional boss at a lower cost, since in the present invention only one manufacturing device is necessary for two operations, namely flow-drilling and flow-boring. The present invention does not require a welding operation to form the boss. The invention allows for the simplification of the organization of the working stations, as well as the equipment. The bonding between the sensor and the exhaust pipe is perfect with regards to the screwing and to the final tightness.

In the declaration, Mr. Pierdet states that it has not been known to use a flow-drilling operation to mount a sensor in an exhaust pipe of an engine. The flow-drilling operation was

used for drilling holes in the automobile industry generally, as evidenced by an article entitled "RVI Annonay: le fluoperçage fait gagner du temps" (a copy of this article was attached to the declaration), which describes the use of flow-drilling in the construction of bus bodies, chassis, and seats. However, the formation of a flow-drilled hole and mounting of a sensor therein in an exhaust device for an internal combustion engine is conspicuously missing from this article.

Mr. Pierdet declared that the formation of a flow-drilled hole and the mounting of a sensor therein in an exhaust device for an internal combustion engine satisfied a long-felt and unsatisfied need in the engine exhaust system art. The long-felt and unsatisfied need is evidenced by the generalization of this new method on the whole range of Renault engines. Mr. Pierdet indicated that the proposed solution has been rapidly accepted because it is easy to implement, it is reliable, and it allows a savings of one Euro on each hole. For these reasons, Mr. Pierdet indicates that the invention was currently being used on all Renault engines, rather than the previous method of inserting and welding a screwed sleeve on the exhaust pipe.

The Appellants respectfully submit that the Declaration of Alain Pierdet provides substantial rebuttal evidence of nonobviousness that clearly outweighs the obviousness rejection of Claim 8.

For the reasons discussed above, the Appellants submit that Claim 8 is patentable.

B. ISSUE 2

Regarding the second issue on appeal, the final Office Action combines the teachings of Reed with the teachings of Feher and page 2, line 4, of the present application in order to arrive at the invention recited in Claims 9-11. However, the Examiner has committed

reversible error in concluding the claimed invention to be obvious over the cited prior art, as there is simply no motivation to combine the teachings of Reed and Feher.

As discussed above in detail with regard to ISSUE 1, the Appellants submit that no motivation existed at the time of the invention to combine the reference teachings of Reed and Feher. Furthermore, the Appellants note that the description on page 2, line 4, of the present application, which is cited in the rejection of Claims 9-11, does not supplement the deficiencies noted above with respect to ISSUE 1. The description on page 2, line 4, of the present application does not suggest the use of an integral housing as claimed or flow drilling methods in the exhaust gas sensor mounting art, but rather discusses the use of a ring welded on the opening of an exhaust pipe. Thus, Claims 9-11 are patentable at least for the reasons stated above in ISSUE 1. Furthermore, these claims are believed to be independently patentable. The Appellants note that the Official Action dated January 16, 2003, does not cite a reference for the teaching of a wall of the pipe element that has a substantially uniform thickness as recited in Claim 9, or a wall of the pipe element that is made of a stainless steel alloy as recited in Claims 10 and 11. However, in order to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (See M.P.E.P. §2143.)

For the reasons discussed above, the Appellants submit that Claims 9-11 are patentable.

C. ISSUE 3

Regarding the third issue on appeal, the final Office Action combines the teachings of Reed with the teachings of Feher and Olson in order to arrive at the invention recited in Claims

13, 14, 16, 18, and 19. However, the Examiner has committed reversible error in concluding the claimed invention to be obvious over the cited prior art, as there is simply no motivation to combine the teachings of Reed and Feher.

As discussed above in detail with regard to ISSUE 1, the Appellants submit that no motivation existed at the time of the invention to combine the reference teachings of Reed and Feher. Furthermore, the Appellants note that Olson, which is cited in the rejection of Claims 13, 14, 16, 18, and 19, does not supplement the deficiencies noted above with respect to ISSUE 1. Olson does not suggest the use of flow drilling methods in the exhaust gas sensor mounting art, but rather discusses the use of flowdrilling to produce a push-to-connect coupling in a fuel tank. Olson is cited for the teaching of a flow-drilling operation to form a bush 18. (Page 5, fourth paragraph of the Official Action dated January 16, 2003.) The Appellants submit that Reed relates to a field of art that is separate and distinct from the inventions of Feher and Olson that one of skill in the art would not have looked to at the time of the conception of the present invention.

Thus, Claims 13, 14, 16, 18, and 19 are patentable at least for the reasons stated above in ISSUE 1. Furthermore, Claims 14, 16, 18, and 19 are believed to be independently patentable. The Appellants note that the Official Action dated January 16, 2003, does not cite a reference for the teaching of a method using an ogival mandrel as recited in Claim 14, a method wherein a wall of the pipe element that has a substantially uniform thickness as recited in Claim 15, a method wherein a wall of the pipe element that is made of a stainless steel alloy as recited in Claim 16, a method wherein a speed of the tool is greater than 500 rpms, or a method wherein a speed of the tool is between 3000 rpms and 5000 rpms.

For the reasons discussed above, the Appellants submit that Claims 13, 14, 16, 18, and 19 are patentable.

D. ISSUE 4

Regarding the fourth issue on appeal, the final Office Action combines the teachings of Reed with the teachings of Feher, Olson, and page 2, line 4, of the present application in order to arrive at the invention recited in Claim 15. However, the Examiner has committed reversible error in concluding the claimed invention to be obvious over the cited prior art, as there is simply no motivation to combine the teachings of Reed and Feher.

As discussed above in detail with regard to ISSUE 1, the Appellants submit that no motivation existed at the time of the invention to combine the reference teachings of Reed and Feher. Furthermore, as discussed above in detail with regard to ISSUE 2, the description on page 2, line 4, of the present application does not supplement the deficiencies noted above with respect to ISSUE 1. Furthermore, as discussed above in detail with regard to ISSUE 3, Olson does not supplement the deficiencies noted above with respect to ISSUE 1. Thus, Claim 15 is patentable at least for the reasons stated above in ISSUE 1, ISSUE 2, and ISSUE 3. Furthermore, Claim 15 is believed to be independently patentable. The Appellants note that the Official Action dated January 16, 2003, does not cite a reference for the teaching of a wall of the pipe element that has a substantially uniform thickness as recited in Claim 15. However, in order to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (See M.P.E.P. §2143.)

For the reasons discussed above, the Appellants submit that Claim 15 is patentable.

Appellant therefore respectfully submits that all of the claims are patentable, and so requests that the final rejection be REVERSED.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Gregory J. Maier
Attorney of Record
Registration No. 25,599

Christopher D. Ward
Registration No. 41,367

Customer Number
22850
Tel. (703) 413-3000
Fax. (703) 413-2220
(OSMMN 10/01)

GJM:CDW:brf
I:\atty\cdw\0143\0143 0473\AppealBrief2.doc

APPENDIX

8. An exhaust device for an internal combustion engine, said exhaust device comprising:

a measuring transducer configured to analyze a flow of exhaust gases from the engine; and

a pipe element adapted to carry the flow of exhaust gases from the engine, said pipe element having an integral housing in which said measuring transducer is mounted, said housing including a threaded hole extending through a bush extending only through a wall of said pipe element,

wherein said bush has an interior portion and an exterior portion, said interior portion extending further within an interior of said pipe element than said exterior portion extends beyond an exterior of said pipe element.

9. The exhaust device according to Claim 8, wherein said wall of said pipe element has a substantially uniform thickness of between 1mm and 3mm.

10. The exhaust device according to Claim 8, wherein said wall of said pipe element is made of a stainless metal alloy.

11. The exhaust device according to Claim 9, wherein said wall of said pipe element is made of a stainless metal alloy.

13. A process for making an exhaust device for an internal combustion engine, said process comprising the steps of:

forming an integral housing in a pipe element adapted to carry a flow of exhaust gases from the engine, the housing being formed from a flow-drilling operation comprising drilling

through only a wall of the pipe element with a tool at a speed and a penetration force adapted to cause melting and upsetting of a material of the wall around the tool in proportion to an advance of this tool until a bush of required height and diameter is obtained, wherein the bush has an interior portion and an exterior portion, the interior portion extending further within an interior of the pipe element than the exterior portion extends beyond an exterior of the pipe element;

tapping a hole through the bush to form internal threads in the hole; and

mounting within the housing a measuring transducer configured to analyze a flow of exhaust gases from the engine.

14. The process according to Claim 13, wherein the tool is an ogival mandrel.

15. The process according to Claim 13, wherein the wall of the pipe element has a substantially uniform thickness of between 1mm and 3mm.

16. The process according to Claim 13, wherein the wall of the pipe element is made of a stainless metal alloy.

18. The process according to Claim 13, wherein the speed of the tool is greater than 500 rpms.

19. The process according to Claim 18, wherein the speed of the tool is between 3000 rpms an 5000 rpms.